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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/603,990 | 06/26/2003 | Mi-Sook Nam | 053785-5120 | 3882 |
| 9629 | 7590 | 06/03/2010 | EXAMINER | |
| MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004 | | | | SCHECHTER, ANDREW M |
| ART UNIT | | PAPER NUMBER | | |
| 2883 | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/603,990 | NAM ET AL. | |
| | Examiner | Art Unit | |
| | ANDREW SCHECHTER | 2883 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 20 April 2010.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-5,8-15 and 17-21 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-5,8-15 and 17-21 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 26 June 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 20 April 2010 has been entered.

Response to Arguments

2. Applicant's arguments filed 20 April 2010 have been fully considered but they are not persuasive. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

The claims were previously rejected under 35 USC 112, 2nd paragraph, since the spatial extent of the recited pixel region and drain electrode was unclear, and critical to patentability since the claim recited them being non-overlapping. The examiner suggested that the applicant could clarify the scope of the claims by discussing where the pixel region and drain electrode are located in, for instance, Fig. 7 of 2001/0019373 to *Kobayashi et al.* The applicant has chosen not to clarify the scope of the claim language in this manner. Breadth is not lack of clarity, however, so rather than continue to reject the claims as unclear, the examiner will withdraw the rejections of the amended

claims under 35 USC 112, 2nd paragraph, and treat the claims as clear but broad in the sense that the spatial extents of the pixel region and the drain electrode can be reasonably interpreted in several different ways, as applied to a single reference or different references. For the prior art applied in the rejections below, the examiner explicitly sets forth an interpretation by which the claim language is met by the references.

The examiner stated in the previous office action that the critical difference between the *Mitsui* structure as applied previously and the structure of the applicant's disclosed invention seems to be that the reflective layer does not overlap "any of the electrode attached to the drain region of the TFT". On p. 13 of their response, the applicant referred to this statement, quoted the present amendments to the claims, and then stated that "the pending Office Action has admitted that *Mitsui* fails to teach or suggest at least these features". This is simply false. Nothing in the pending office action addressed the amended features, and the limitation which the examiner did address (regarding the reflective layer not overlapping "any of the electrode attached to the drain region of the TFT") is in no way reflected in the amended claim language. The previous rejections are therefore maintained, modified as necessary by the amendments to the claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 10, 12, 13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kubota, et al.*, US 2002/0171792 in view of *Mitsui et al.*, U.S. Patent No. 5,408,345, in view of *Maeda et al.*, U.S. Patent No. 7,123,325 and further in view of official notice/admitted prior art.

Kubota discloses [see Fig. 1, for instance] a transreflective liquid crystal display device comprising a substrate [2] having a reflective portion and a transmissive portion, a pixel region defined to include the reflective and transmissive portions; a gate line [14a] on the substrate, a data line [17], a thin film transistor [14] connected to the gate line and the data line, and including a gate electrode [14a], an active layer [12], and source and drain electrodes [14b, 14c]; an insulating layer [19] having an open portion at the transmissive portion, a reflective layer [20] on the insulating layer having a transmissive hole at the open portion, a pixel electrode [3] on the reflective layer, an opposing substrate [5] facing the substrate, and a common electrode [6] on an inner surface of the opposing substrate, the common electrode being substantially flat.

Kubota possibly does not explicitly disclose that the gate and data lines cross to form a pixel region; the examiner takes official notice that this was well-known in the art at the time of the invention [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have it so, motivated by the desire to form the standard active matrix of pixels for the display.

Kubota does not disclose the substrate having a light-blocking portion, the reflective layer disposed on the pixel region and not overlapping a region covered by the active layer, the gate electrode, the source electrode and the drain electrode, with the TFT and the drain electrode on the light-blocking portion and not overlapping the pixel region. However, *Mitsui* discloses [see Fig. 5] an analogous device having the analogous reflective layer [38] disposed on the pixel region and not overlapping a region covered by the active layer, the gate electrode, the source electrode, and the drain electrode [whose spatial extent is discussed below] and teaches doing so [col. 3, lines 32-45], saying that when the reflective layer does overlap the TFT, the signal applied to the reflective layer can spuriously act as a gate electrode, causing the TFT to malfunction, and can produce an undesirable parasitic capacitance between the reflective layer and the gate electrode. It would have been obvious to one of ordinary skill in the art at the time of the invention to have the reflective layer not overlapping the TFT and its component parts, motivated by the desire to avoid such electrical problems as taught by *Mitsui*. Without the reflective electrode covering the TFT as in *Kubota*, it is desirable to have the light-blocking region [created by *Mitsui*'s 46b] in order to prevent ambient light from causing leakage through the TFT and in order to prevent light from reaching the viewer's eyes when it has not passed through a region of liquid crystal properly controlled by a pixel electrode, thus increasing the contrast ratio and improving the display quality. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention for the substrate have a light-blocking portion as shown in

Mitsui, and for the TFT and the drain electrode [whose spatial extent is discussed below] to be on the light-blocking portion [as shown in *Mitsui's* Fig. 5].

The spatial extent of the drain electrode has been repeatedly discussed throughout the prosecution of the case; the applicant has offered no specific guidance on how to identify the spatial extent of the drain electrode in a given prior art reference. The broadest reasonable interpretation has therefore been adopted: in this case, that the drain electrode is the portion of the electrode touching the drain region of the TFT which is adjacent to the channel region of the TFT, and that it does not include the entire electrode touching the drain region of the TFT. In the device of *Kubota* in view of *Mitsui*, the TFT and drain electrode would be on the light-blocking portion and not overlapping the pixel region (which includes the reflective and transmissive portions) or the reflective layer.

Kubota does not disclose that the insulating layer [19] has a plurality of uneven patterns consisting of a first organic material layer within the reflective portion, the uneven patterns partially covering the substrate, and a second organic material layer on the first organic material layer. *Maeda* [see Fig. 10K, for instance] discloses an analogous transreflective LCD in which the insulating layer under the reflective layer and pixel electrode has a plurality of uneven patterns consisting of a first organic material layer [51] within the reflective portion, the uneven patterns partially covering the substrate, and a second organic material layer [52] on the first organic material layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to have it be so, motivated by the desire to make the surface of the reflective layer bumpy,

so that the light diffusively reflects off the surface (rather than reflecting like a mirror), thus improving the display quality. Claim 1 is therefore unpatentable.

Considering the additional limitations of claim 10, *Kubota* also discloses a liquid crystal layer between the pixel electrode, wherein the pixel electrode and the common electrode are separated by a first cell gap in the transmissive portion, and a second cell gap in the reflective portion, and the first cell gap is twice greater than the second cell gap [see paragraph 0084, for instance]. Claim 10 is therefore unpatentable as well.

Considering the additional limitations of claims 12 and 19, *Kubota* in view of *Maeda* also discloses the method of fabricating the above LCD, except perhaps for the step of performing an exposure and development process on the first and second photosensitive organic material layers. *Maeda* discloses using organic layers which are photosensitive, but does not necessarily disclose the particular patterning steps recited. The examiner takes official notice that for patterning such organic layers, performing an exposure and development process on organic layers was well known [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03]. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so, motivated by this being the standard technique for patterning organic materials in the art. Claims 12 and 19 are therefore unpatentable as well.

The first and second organic material layers are formed from a photosensitive material, including comprising a photo-acrylic resin [see *Maeda*, col. 13, lines 29-35, for instance], so claims 2 and 3 are also unpatentable. Considering claim 13, it would have been “obvious to try” a photo-acrylic resin for both the first and second photosensitive

material layers, with predictable results, as this type of material is routinely used in forming such organic layers, as evidenced by *Maeda* above, so claim 13 is also unpatentable.

5. Claims 4, 5, 14, 15, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kubota, et al.*, US 2002/0171792, *Mitsui et al.*, U.S. Patent No. 5,408,345, *Maeda et al.*, U.S. Patent No. 7,123,325, and official notice/admitted prior art as applied above, and further in view of *You*, U.S. Patent No. 7,023,508.

Kubota discloses an insulating layer [18] covering the gate line, the data line, and the thin film transistor, but does not state that it is inorganic. *You* discloses an analogous device [see Fig. 3, for instance], which has an inorganic material layer [116] made of silicon nitride, covering the gate line, the data line, and the thin film transistor. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an inorganic layer, such as *You*'s silicon nitride, in the above device, motivated by *You*'s teaching that this maintains the reliability of the transistor and pads and enhances the strength of COG bonding [col. 9, lines 1-8]. Claims 4, 5, 14, 15, and 21 are therefore unpatentable.

6. Claims 8, 9, 11, 17, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kubota, et al.*, US 2002/0171792, *Mitsui et al.*, U.S. Patent No. 5,408,345, *Maeda et al.*, U.S. Patent No. 7,123,325, and official notice/admitted prior art as applied above, in view of official notice.

Kubota does not necessarily disclose gate pads, data pads, or a capacitor electrode overlapping the gate line. The examiner takes official notice that these

features are well-known and conventional in the art [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03]. It would have been obvious to one of ordinary skill in the art at the time of the invention to include them in the above device, motivated by the desire to make electrical contact to the gate and data lines, and to provide a reliable storage capacitance to improve the display quality. Claims 8 and 17 are therefore unpatentable.

Similarly, to make electrical contact to these, it is necessary to have drain contact holes, capacitor contact holes, gate pad contact holes, and data pad contact holes as recited; the examiner takes official notice that such are well-known [as this was not traversed by the applicant, this is considered admitted prior art; see MPEP 2144.03] and would have been obvious to one of ordinary skill in the art at the time of the invention, for the purpose of making electrical contact to the relevant electrodes through the second organic material layer. Claims 9 and 18 are therefore unpatentable.

The difference in cell gaps is provided by the height of the insulating film, and for the first (transmissive) cell gap to be twice the second (reflective) cell gap, the height needs to be equal to the second cell gap. The uneven patterns are equal to or less than this height, so they have a height equal to or less than the second cell gap, as required by claims 11 and 20. Claims 11 and 20 are therefore unpatentable. Even were this not true, adjusting the height of the uneven patterns to improve the reflective properties of the reflective layer, or to optimize the relative cell gaps for better liquid crystal behavior, would have been obvious to one of ordinary skill in the art at the time of the invention,

motivated by the desire to optimize these features of the device, so claims 11 and 20 are unpatentable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Robinson can be reached on (571) 272-2319. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Schechter/
Primary Examiner, Art Unit 2883
Technology Center 2800
30 May 2010